

CLAIMS

1. A water purification apparatus comprising:
a cathode compartment;
an anode compartment;
at least one ion-depleting compartment, a portion of the at least one ion-depleting compartment positioned between the cathode compartment and the anode compartment; and
wherein the cathode compartment is fluidly connected to the ion-depleting compartment.
2. The water purification apparatus of claim 1 further comprising at least one ion-concentrating compartment adjacent the at least one ion-depleting compartment, wherein the anode compartment is fluidly connected to the ion-concentrating compartment.
3. The water purification apparatus of claim 1 wherein the cathode compartment is in fluid communication with a purified fluid outlet.
4. The water purification apparatus of claim 3 wherein the purified fluid outlet is downstream of the cathode compartment.
5. The water purification apparatus of claim 1 wherein at least a portion of any water in the apparatus is grounded via a cathode.
6. A method of purifying a fluid comprising:
passing a portion of a first fluid through an ion-depleting compartment of an electrochemical device to produce a second fluid; and
passing at least a portion of the second fluid through a cathode compartment of the electrochemical device.
7. The method of claim 6 wherein all of the second fluid is passed through the cathode compartment.
8. The method of claim 6 further comprising dissolving hydrogen in the second fluid.

9. The method of claim 6 further comprising passing a second portion of the first fluid through an ion-concentrating compartment of the electrochemical device;
passing the second portion of the first fluid through an anode compartment of the electrochemical device; and
reducing the LSI of the second portion of the first fluid.
10. The method of claim 9 wherein the LSI is reduced to less than about 0.
11. The method of claim 6 further comprising passing the second fluid to a point of use after it has flowed through the cathode compartment.
12. The method of claim 6 further comprising reducing the corrosiveness of the second fluid.
13. The method of claim 6 wherein greater than about 10% and less than about 90% of the hardness is removed from the second fluid.
14. The method of claim 13 wherein more than about 30% and less than about 70% of the hardness is removed from the second fluid.
15. The method of claim 13 wherein more than about 50% of the hardness is removed from the second fluid.
16. The method of claim 6 wherein the electrochemical device comprises an electrodeionization device.
17. The method of claim 6 wherein the electrochemical device comprises an electrodialysis device.
18. A method of purifying water comprising:
passing a first portion of a first water stream through a cathode compartment of a water purification apparatus to produce a second water stream; and

passing at least a portion of the second water stream through an ion-depleting compartment to produce purified water.

19. The method of claim 18 further comprising dissolving hydrogen in the second fluid.
20. The method of claim 18 further comprising passing a second portion of the first water stream through an ion-concentrating compartment of the water purification apparatus;
passing the second portion of the first water stream through an anode compartment of the water purification apparatus; and
reducing the LSI of the second portion of the first water stream.
21. The method of claim 18 further comprising delivering the second water stream to a point of use.
22. The method of claim 18 further comprising reducing the corrosiveness of the second water stream.
23. The method of claim 18 wherein greater than 10% and less than 90% of the hardness is removed from the second water stream.
24. The method of claim 23 wherein more than about 30% and less than about 70% of the hardness is removed from the second water stream.
25. The method of claim 23 wherein more than about 50% of the hardness is removed from the second water stream.
26. The method of claim 18 wherein the LSI is reduced to less than about 0.
27. The method of claim 18 wherein the water purification apparatus comprises an electrodeionization apparatus.

28. A method comprising:
- passing a first portion of a first fluid through an ion-concentrating compartment of an electrochemical device to produce a second fluid;
 - passing a second portion of the first fluid through an ion-depleting compartment of the electrochemical device to produce a third fluid;
 - reducing the pH of the second fluid; and
 - reducing the corrosiveness of the third fluid.
29. The method of claim 28 wherein the corrosiveness of the third fluid is reduced by adding hydrogen gas to the fluid.
30. The method of claim 28 wherein the concentration of any oxidative species in the third fluid is reduced in the cathode compartment.
31. The method of claim 28 further comprising passing the third fluid to a domestic point of use.
32. The method of claim 28 further comprising recirculating the third fluid through the ion-depleting compartment.